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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,723	04/18/2005	Puwei Liu	LDQ-111/PCT/US	3865
31217 7590 01/28/2008 LOCTITE CORPORATION 1001 TROUT BROOK CROSSING ROCKY HILL, CT 06067			EXAMINER SELLERS, ROBERT E	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 01/28/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/531,723

Applicant(s)

LIU ET AL.

Examiner

Robert Sellers

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 4, 6-12, 16-20, 22, 28, 34 and 39 is/are pending in the application.
- 4a) Of the above claim(s) 2, 4, 8, 17-20, 22, 28 and 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 6, 7, 9--12, 16 and 34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

1. The election with traverse of Group I, Epon 8132 epoxy resin, X-BMI free radical polymerizable component, RICON 130 crosslinking component and silver flake filler in the reply filed on January 7, 2008 is acknowledged. The traversal is on the ground that a thorough search for art relevant to the claims of Group I would appear to also suffice for the claims of Group II and should not be a serious burden.

2. This is not found persuasive because the criteria for the restriction is based on PCT Rule 13.1 since this application is a 371 of PCT /US03/33243. The special technical feature of combination of an epoxy or episulfide resin, or anionic or cationic reactive component, free radical component and crosslinking component does not make a contribution over the prior art as set forth hereinbelow, thereby validating a holding of lack of unity between Groups I-V.

The requirement is still deemed proper and is therefore made FINAL.

3. Claims 2, 22, 28 and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a non-elected inventions, there being no allowable generic or linking claim. The restriction requirement was traversed in a timely manner in the reply filed on January 7, 2008. Claims 4, 8 and 17-20 are withdrawn as being directed to non-elected species.

4. Withdrawn claim 4 is dependent upon cancelled claim 3. Claim 3 requiring a curative should have been included in Group II with claim 2.

5. Withdrawn claim 8 contains no antecedent basis for the maleimide- or nadimide compound in claim 1 wherefrom it depends.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 12, 16 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent No. 2000-104032.

6. The Japanese patent (translation, page 8, Example, paragraphs 40 and 42) shows a composition comprising a cresol novolak epoxy resin, lauryl acrylate (within the claimed free radical polymerizable component (b) as defined in claim 12), a carboxyl groups-containing polybutadiene containing unsaturated groups (page 2, paragraph 7, general formula (I)) and the elected species of silver flake filler.

Claims 1, 6, 7, 12, 16 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent No. 64-20262 or Harper Patent No. 5,962,586.

7. The Japanese patent (CAPLUS abstract) shows a blend of an epoxy resin, bismaleimide/cyanate ester copolymer, the elected species of maleic anhydride-modified polybutadiene and powdered nylon, poly(ethersulfone) and carbon fiber fillers.

8. Harper (col. 7, Example 4) shows a mixture of the epoxy resins and the elected species of maleinized polybutadiene of Example 1 (col. 6) combined with a bis(maleimide of methylene dianiline).

Claims 1, 6, 7, 9, 10, 12, 16 and 34 are rejected under 35 U.S.C. 102(b) or 102(e) with respect to Capote et al. Patent No. 6,616,984 as being anticipated by Zahir et al. Patent No. 4,127,615 (Zahir et al. '615) or Japanese Patent No. 3-281521 (Japanese '521) or Capote et al. or Hefner, Jr. Patent No. 4,558,115.

9. Zahir et al. '615 (col. 1, lines 40-52) discloses a thermosetting mixture containing a bismaleimide such as N,N'-hexamethylene-bismaleimide (col. 4, lines 16-19; within formula (I) of claim 9 wherein X is an alkylene group, R is hydrogen and m is 2), an epoxide compound containing at least two epoxy groups per molecule ( $\beta$ ), ( $\gamma$ ) or ( $\delta$ ) (col. 2, lines 9-21) and an alkenylphenol posssssing a phenolic hydroxyl group reactive with the epoxy compound and an alkenyl group reactive with the bismaleimide, and a filler (col. 5, line 67 to col. 6, line 2).

10. Japanese '521 (Patent Abstracts of Japan) sets forth a formulation prepared from a polyepoxy compound, a polymaleimide such as N,N'-ethylenebismaleimide and an alkenylphenol compound.

11. Capote et al. (col. 2, lines 46-60) espouses a blend of a cyanate ester, an epoxy resin, a bismaleimide such as that of the generalized structure depicted in column 7, lines 2-13 wherein the R moiety includes a lower alkylene, a co-curing agent such as a compound containing glycidyl ether group(s) reactive with the epoxy resin and allyl group(s) reactive with the bismaleimide (col. 9, lines 54-57).

12. Hefner, Jr. (col. 1, lines 38-58) is directed to a composition obtained from a polyepoxide, a polymaleimide such as N,N'-ethylenebismaleimide; N,N'-ethylenebis(2-methylmaleimide or N,N'-hexamethylenebismaleimide (col. 7, lines 59-61), an alkenyl phenyl cyanate having a cyanate group reactive with the glycidyl ether group of the polyepoxide (col. 9, lines 57-68) and an alkenyl group reactive with the polymaleimide, and a filler (col. 12, line 38).

Claims 1, 6, 7, 10, 12, 16 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Arpin Patent No. 4,994,536.

13. Arpin (col. 11, Example 3) shows a mixture of a brominated epoxy resin, N,N'-4,4-diphenylmethanebismaleimide, an acrylate reactant of the novolak epoxy diacrylate of formula (II) of Example 1 (col. 9, lines 44-47 as illustrated in col. 3, lines 11-36 wherein the pendant OH groups are reactive with the epoxy resin and the terminal acrylate groups are reactive with the bismaleimide. Fillers can be added according to column 7, lines 32-36.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 6, 7, 9-12, 16 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over delos Santos et al. Patent No. 7,312,534; Zahir et al. 'Patent No. 4,130,600 (Zahir et al. '600) and Kanagawa et al. Patent No. 4,755,569.

14. Delos Santos et al. (col. 26, Table 1) shows a blend of the elected species of X-BMI which is a 1,20-bismaleimido derivative of 10,11-dioctyleicosane and the elected species of RICON 130 maleic anhydride-grafted polybutadiene. The blend when utilized as a pre-applied die attach adhesive can include a benzoxazine-containing compound, epoxy resin or episulfide resin and/or an oxazoline component or cyanate ester component within the claimed anionically or cationically reactive component (a) according to the instant specification on page 7, paragraph 22 and page 11, paragraph 31 (col. 13, lines 5-16). An electrically conductive filler such as silver flake can be added according to column 21, lines 59-65.

15. Although the claimed benzoxazine-containing compound and epoxy or episulfide resin are not exemplified, it would have been obvious to blend them with the components of the example in order to impart beneficial properties endemic to the resins such as chemical resistance and adhesiveness (Harper, col. 1, lines 14-18).

16. Zahir et al. (col. 1, line 33 to col. 2, line 6) is drawn to a thermosetting mixture derived from a bismaleimide such as N,N'-hexamethylene-bismaleimide (col. 3, lines 3-4), an allyl group(s)-containing epoxide compound, epoxide compounds free from allyl groups (col. 4, lines 36-32) and fillers (col. 5, lines 33-36). Although the epoxide compound free from allyl groups are not mandatory, it would have been obvious to incorporate it in order to enhance the chemical resistance and adhesiveness (Harper, col. 1, lines 14-18).

17. Kanagawa et al. (col. 1, lines 61-68) reports a thermosetting resin composition comprising a phenol novolac resin containing hydroxyl and allyl ether groups, a polymaleimide along with fillers (col. 3, lines 46-48). Another kind of thermosetting resin such as an epoxy resin can be added according to column 3, lines 55-58. Although the thermosetting resin is optional, it would have been obvious to include it in order to improve the chemical resistance and adhesiveness (Harper, col. 1, lines 14-18).

Claims 1, 6, 7, 9-12, 16 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jaeger Patent No. 6,806,309 and PCT Publication No. WO 98/30647 in view of Harper and Capote et al.

18. Jaeger (col. 9 Example) shows a blend of X-Bismaleimide within the structure depicted in column 3, line 32 to col. 5, line 33 which is equivalent to formula (I) of claim 9 and Ricon 130. An electrically conductive filler such as silver flake can be included according to column 7, lines 2-7.



19. The PCT publication (pages 11-12, Example 1) shows a resin system composed of 1,20-bismaleimido-10,11-dioctyleicosane, maleated polybutadiene Ricon 130 MA20 and silver flake. Mixtures of maleimides and epoxy resins are contemplated on page 2, lines 25-26 and page 3, lines 2-3.

20. The claimed epoxy resin is not exemplified. Harper and Capote et al. are described hereinabove. It would have been obvious to incorporate the epoxy resin of Harper and Capote et al. into the blend of Jaeger and the PCT publication in order to optimize the chemical resistance and adhesiveness (Harper, col. 1, lines 14-18) and lower the dielectric constant, thermal expansion, water absorption increase the glass transition temperature and decomposition temperature, and improve the toughness (Capote et al., col. 10, lines 1-10).

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Zahir et al. patents, Japanese '521, Capote et al., Hefner, Jr. and Kanagawa et al. in view of Dershem et al. Patent No. 6,034,195 and delos Santos et al.

21. The Zahir et al. patents, Japanese '521, Capote et al., Hefner, Jr. and Kanagawa et al. are discussed hereinabove and are open to bismaleimides in general. The claimed maleimide-, itaconimide- or nadimide-containing compound having sufficient length and branching to render it liquid is not recited.

22. Dershem et al. (col. 3, line 1 to col. 4, line 61) discloses the liquid maleimide resin of formula (I) of claim 9 which provides adhesive compositions with a combination of physical properties critical and successful for commercial applications (col. 9, lines 34-57).

23. Delos Santos et al. is referred to hereinabove and depicts the liquid maleimide, itaconimide and nadimide of formulae (I), (II) and (III) of claim 9 (col. 6, line 33 to col. 10, line 21 such as the preferred 1,20-bismaleimido-10,11-dioctyleicosane (col. 13, lines 2-3).

24. It would have been obvious to employ the maleimide resin of Dershem et al. or the maleimide, itaconimide or nadimide of delos Santos et al. as the bismaleimides of the Zahir et al. patents, Japanese '521, Capote et al., Hefner, Jr. and Kanagawa et al. in order to impart the following properties recognized in Dershem et al. (col. 9, lines 34-57):

1. Good handling properties without an inert diluent.
2. Rapid cure.
3. Stability at temperatures of at least 250°C.
4. Flexibility.
5. Low moisture uptake.
6. Good adhesion.

Furthermore, delos Santos et al. teaches the added advantages of avoiding ordinary processing steps of flowable adhesives and dispensing, handling and storage issues (col. 3, lines 1-19).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over  
Husson, Jr. et al. Patent No. 5,789,757.

25. Husson, Jr. et al. (col. 4, lines 1-48) sets forth a thermosetting resin composition prepared from a maleimide within the confines of formula (I) of claim 9 wherein X is (A), (B) or the first aromatic moiety of (F), a polycyanate ester monomer (col. 10, Example 3, Formula D) and Ricon R-130 maleated polybutadiene (col. 7, lines 21-26). Although the maleated polybutadiene is not exemplified, it would have been obvious to include it in order to enhance the adhesion.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Sellers whose telephone number is (571) 272-1093. The examiner can normally be reached on Monday to Friday from 9:30 to 6:00. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

/Robert Sellers/

Robert Sellers  
Primary Examiner  
Division 1796